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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/858,299	05/15/2001	Zezhang Hou	AUD1P004C1	2952

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BERKELEY, CA 94704-0778

EXAMINER
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HARVEY, DIONNE

ART UNIT	PAPER NUMBER
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2643

DATE MAILED: 06/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)
	09/858,299	HOU, ZEZHANG
Examiner	Art Unit	
Dionne N Harvey	2643	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on \_\_\_\_.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) \_\_\_\_ is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) 37-39 is/are allowed.
- 6) Claim(s) 1-19 and 22-36 is/are rejected.
- 7) Claim(s) 20 and 21 is/are objected to.
- 8) Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All    b) Some \* c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) <input type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413)
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	Paper No(s)/Mail Date: ____ .
3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>2,3</u> .	5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)
	6) <input type="checkbox"/> Other: ____ .

## DETAILED ACTION

### ***Claim Rejections - 35 U.S.C. § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1-6 are rejected under 35 U.S.C. 102(b) as being anticipated by Matouk (US 5,625,684).

Regarding claim 1, Matouk teaches an adaptive directional sound processing system, comprising at least two microphones(36,41); a subtraction circuit(52); a delay circuit (adaptive filters characteristically include delay, adding, and multiplying elements, as is well known in the art) and delay amount determination circuit (52 and 56 work together as an adaptive element for comparing and adapting the delay according to the control signal 57).

Regarding claim 2-5, Matouk teaches that the adaptive delay amount varies so as to suppress undesired sound (see column 3, lines 43-53).

Regarding claim 6, Matouk teaches that the processing system resides within a device for aiding in hearing of a telephone handsets i.e., a hearing aid device, as claimed.

2. Claims 7-16, 18,19,22-34 and 36 are rejected under 35 U.S.C. 102(b) as being anticipated by Christensen (US 4,131,760).

Regarding claims 7 and 22, Christensen teaches an adaptive sound processing system comprising at least two microphones (101,110); a delay circuit(114); a logic circuit(121) and delay amount determination circuit (elements 141,143 and 114 function to determine the degree of delay; also see column 6, line 53 - column 7, line 10).

Regarding claims 8-11, Christensen teaches that the delay amount varies to suppress undesired sound, minimize energy of the output signal(143) and maximize SNR.

Regarding claim 12, Christensen teaches that the adaptive sound processing system resides within any audio system device including telephones and other audio communications i.e., hearing aids, as claimed.

Regarding claim 13, Christensen teaches that the adaptive delay amount is added to the previously determined adaptive delay amount (see output of delay element 114 which is added to the initial signal for creation of a new control signal via 121,141,143).

Regarding claim 14, Christensen teaches that the delay is determined based on a change in energy on the output signal (141,143; also see column 6, line 53 - column 7, line 10).

Regarding claims 15 and 16, Christensen teaches that the two possible delay increments are the previous delay increment (decrease of delay) or an inverse previous delay increment (increase of delay), as broadly claimed.

Regarding claim 18, Christensen teaches scaling i.e., increasing or decreasing the change in energy on the output signal (via 143), as broadly claimed.

Regarding claim 19, Christensen teaches that the delay determined comprises an energy estimator and a delay generator, which generates delay based upon the energy estimate (141,143; also see column 6, line 53 - column 7, line 10).

Regarding claims 23 and 27, Christensen inherently teaches the methods of claims 23 and 27 by the apparatus of claims 7 and 22.

Regarding claim 24, Christensen teaches inducing a delay amount(114) on one of the first and second sound signals(101,110).

Regarding claim 25, Christensen teaches repetition of operations of the method so as to suppress unwanted noise (see column 6, line 53 - column 7, line 10).

Regarding claim 26, Christensen teaches that the adaptive sound processing system resides within any audio system device including telephones and other audio communications i.e., hearing aids, as claimed.

Regarding claims 28 and 29, Christensen teaches that the adaptation operates so to as to minimize energy of the output signal (143) and maximize SNR.

Regarding claims 30 and 31, Christensen teaches that combining comprises adding or subtracting (121) the first microphone output and the delayed second microphone output, as is well understood in the art.

Regarding claim 32, Christensen teaches that the delay is determined based on a change in energy on the output signal (114 operates according to the change of energy supplied by element 143; also see column 6, line 53 - column 7, line 10).

Regarding claims 33 and 34, Christensen teaches that the two possible delay increments are the previous delay increment (decrease of delay) or an inverse previous delay increment (increase of delay), as broadly claimed.

Regarding claim 36, Christensen teaches scaling i.e., increasing or decreasing the a change in energy on the output signal (via 143), as broadly claimed.

***Claim Rejections - 35 U.S.C. § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 7,13,17,21 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matouk (US 5,625,684).

Regarding claims 7 and 21, Matouk teaches an adaptive directional sound processing system and method, comprising at least two microphones(36,41); a subtraction circuit; a delay circuit (adaptive filters characteristically include delay, adding, and multiplying elements, as is well known in the art) and delay amount

determination circuit (52 and 56 work together as an adaptive element for comparing and adapting the delay according to the control signal 57).

Matouk does not specifically teach that the subtraction circuit is a logic circuit. However, as is well known in the art, logic circuits are often implemented to perform mathematical operations. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to substitute a logic circuit for the subtraction circuit of Matouk thereby providing a control signal to the adjustable delay element for the purpose of enhancing the directional characteristics of the sound processing system.

Regarding claim 13, Matouk teaches an adaptive filter. Adaptive filters characteristically comprise adding, multiplying and delay elements for the reprocessing of a signal so as to result in the desired output signal. Therefore, the adaptive filter of Matouk inherently includes an adaptive delay amount which is added to the previously determined adaptive delay amount, as claimed.

Regarding claims 17 and 35, The Adaptive filter of Matouk characteristically comprises adding, multiplying and delay elements for the reprocessing of signal so as to result in the desired output signal. Therefore, the adaptive filter of Matouk inherently multiplies a previous delay increment by the change in energy of the signal, as claimed.

***Allowable Subject Matter***

Claims 37-39 are allowed.

***Conclusion***

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled Comments on Statements for Allowance.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dionne Harvey whose telephone number is (703) 305-1111. The examiner can normally be reached on Monday through Friday from 8:30am to 6:00pm.

**Any responses to this action should be mailed to:**

Commissioner of Patents and Trademarks  
Washington, DC 20231

**or faxed to:**

(703) 308-6306, for formal communications for entry

**Or:**

(703) 308-6296, for informal or draft communications, please label PROPOSED or DRAFT.

Hand delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA., Sixth Floor(Receptionist)

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis Kuntz, can be reached at (703) 305-4708.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dionne Harvey whose telephone number is (703) 305-1111.

D.H.

June 17, 2004



HUYEN LE  
PRIMARY EXAMINER